EXHIBIT D

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

IAN J. BROWN, JAMES BROWN and BARBARA BROWN Plaintiffs v. UNITED STATES OF AMERICA, VERIZON NEW ENGLAND, INC. and BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC Defendants	CIVIL ACTION NO. 04-11924-RGS

AFFIDAVIT OF MALCOLM H. RAY, P.E., PH.D

My name is Malcolm H. Ray. I make this affidavit based upon my personal knowledge.

1. I am a Professor of Civil and Environmental Engineering and a Professor of Mechanical at Worcester Polytechnic Institute. I have been employed in these capacities since 1999.

2. A copy of my curriculum vitae is attached hereto as Exhibit A.

3. As set forth in my CV, I received my Bachelors degree in Civil and Environmental Engineering from the University of Vermont in 1983 and my Master's of Science Degree in Civil and Environmental Engineering from Carnegie-Mellon University in 1984. I received a Ph.D. in Civil and Environmental Engineering from Vanderbilt University in 1993.

4. I began my career in roadside safety research when I joined the Roadside Safety Section at Southwest Research Institute in San Antonio, Texas. In 1987, I became a Research Instructor at Vanderbilt University in Nashville, Tennessee where I pursued a variety of roadside safety contract research projects. I was involved in a variety of roadside safety research projects for the Federal Highway Administration, National Cooperative Highway Research Program and a variety of other government and industrial sponsors through my own research consulting business, Momentum Engineering which I founded in 1989. I spent almost four years as an on-site support contractor for the Federal Highway Administration at the Turner-Fairbank Highway Research Center in McLean, Virginia where I was instrumental in bringing new non-linear dynamic finite element techniques to bear on roadside safety problems. In 1995, I became an Assistant Professor of Civil and Environmental Engineering at the University of Iowa where I continued my research in roadside safety, impact strength of material and nonlinear finite element modeling. Since 1999, I have served as the Ralph H. White Distinguished Professor of Civil and Environmental Engineering at Worcester Polytechnic Institute in Worcester, Massachusetts. I have continued my work in roadside safety and roadside design by performing numerous projects for the National Cooperative Highway Research Program (NCHRP), a variety of State Departments of Transportation, the U.S. Department of Transportation and private manufacturers of roadside safety hardware. Details of these projects can be found in my vita (i.e., Exhibit A).

5. I have published nearly 80 journal articles, conference papers and reports on various aspects of highway and roadside safety. I am or have been a registered professional engineer in the States of Maine, Tennessee, Illinois and Iowa.

6. I am currently part of the Civil Engineering Department's Highway Infrastructure Program at WPI. I am also the Director of the National Highway Traffic Safety Administration sponsored Center for Human Impact Performance and the Director of WPI's unique Impact Engineering Program.

7. As a recognized expert in Roadside/Highway design, I am familiar with the education, training and experience of other professionals in my field. I am familiar with the methods employed by roadside design professionals in rendering expert opinions with respect to roadside design, roadside barrier design and utility placements.

8. Roadside/Highway design professionals are educated and trained civil engineers, with undergraduate and sometimes graduate degrees in civil engineering. They typically take courses in highway design and transportation system design as a part of their typical undergraduate education. They frequently attended seminars or take courses in roadside design from one or all of the following organizations:

    1. ASCE - American Society of Civil Engineers;
    2. The Federal Highway Administration;
    3. State Departments of Transportation;
    4. ATSSA – American Traffic Safety Services Association;
    5. One of several private companies offering Roadside Design Seminars.

9. Roadside/Highway Design professionals are typically well-versed in and trained in utilizing the following professional publications:

    1. The Roadside Design Guide published by the American Association of State and Highway Transportation Officials (AASHTO);
    2. A Policy on Geometric Design of Highways and Streets published by AASHTO;
    3. The Highway Safety Design and Operations Guide, 1997, by AASHTO;
    4. A Guide for Accommodating Utilities within Highway Right-of-way, published by AASHTO.
    5. Recommended Procedures for the Safety Performance Evaluation of Highway Features published by the Transportation Research Board of the National Research Council.

10. There are several professional societies, private organizations, and government sponsored organizations dedicated to Roadside/Highway Design. Roadside/Highway Design professionals typically affiliate themselves with some or all of these groups:

    1. American Society of Civil Engineers;
    2. ATSSA – American Traffic Safety Services Association;
    3. Transportation Research Board, Committee on Roadside Safety;

4. AASHTO, Task Force for Roadside Safety;
5. ARTBA – American Road and Transportation Builders Association;
6. AGC – American General Contractors
7. AASHTO-ARTBA-AGC Task Force 13;

11. In analyzing and rendering a professional expert opinion regarding the design of a roadside, including the placement of utilities thereon, a roadside design professional conducts a thorough analysis employing accepted methods in the industry and relies on published data, the publications listed above, other scholarly and peer-reviewed articles from reputable publications in the industry, and generally accepted civil engineering and economic principles.

12. In assessing the configuration of any specific roadside, including the placement of utility poles, a roadside design expert would take into account, among others things, the following factors:

i. Local, state or federal design standards or guidelines;
ii. Type of roadway (i.e., highway, urban or rural);
iii. Number of lanes of traffic;
iv. Volume of traffic;
v. Speed limit;
vi. Topography of the roadway;
vii. Width of right of way;
viii. History of accidents at the particular location;

ix. Existence of sufficient right-of-way width to accommodate utilities and other roadside structures;

x. Existence of sufficient right-of-way width to create a clear zone;

xi. Feasibility and effectiveness of warning markings such as signage, traffic signals, reflective paint or other warning devices;

xii. The availability of alternative locations for the placement of utilities;

xiii. An economic analysis of the costs associated with reconfiguring, shielding or relocating existing utilities and other roadside structures in light of the magnitude of the resulting benefit to public safety;

xiv. An engineering analysis of feasibility of reconfiguring, shielding or relocating existing utilities and structures, including an analysis of the entire pole line and how relocating any particular pole would impact the engineering/design of the remaining poles, in light of the magnitude of the resulting benefit to public safety;

xv. The existence of utility easements and the difficulty of obtaining additional or alternative easements or permitting; and

xvi. The Necessity and feasibility of installing various types of roadside barriers.

13. There are many additional considerations that will arise out of the particular circumstances of the specific location at issue. A proper expert analysis concerning the design of the roadside, including placement or the necessity or feasibility of relocating utility poles, should take into account all relevant factors at the specific location at issue.

14. Failure to utilize these methods and conduct a thorough analysis based on all available data would be inconsistent with the principles generally accepted and utilized by civil engineering professionals and, more specifically, roadside design engineering experts.

SIGNED UNDER THE PAINS AND PENALTIES OF PERJURY THIS 12 DAY OF MACRH, 2007.

Malcolm H. Ray